EE331 Term 1, 2006

QUIZ # 1

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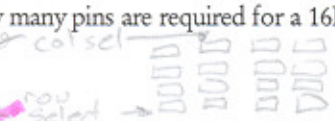
- *45 Minutes. No materials are allowed. (Number) indicates weighting.*
- *No interaction with another student is allowed during the exam. Cheating will not be tolerated.*

1. Numbers are stored in the order in which they are printed out in ____Little____ Endian. (0.4)
2. There are two ways to represent real numbers in computer. Which one is faster and more accurate? (0.4) ____Binary____
3. From flip-flops and latches, which one are level sensitive? (0.4) ____latches____
4. What are the functions of the accumulator register in a computer arithmetic/logic unit? (1)

To store and send values

5. How many pins are required for a 16K ×8 RAM with common I/O and one CS input? Consider other pins as well if necessary. (1)



4

6. The MCM6209C is a 64K × 4 static RAM chip. How many of these are needed to form a 256K × 16 module? (1)

4

7. Determine how many bits each of the following registers can hold? (0.7)

PC, DAR, IR, DR, ACCA, Address Latch/Buffer, Data Buffer

16 8 8 8 8 16 16

8. Assume that initially [PC] = C807, [A] = 09, and [C457] = 08. (0.6)

```
C807   BB      ; ADDA
C808   C4
C809   57
```

At the completion of this instruction, [PC] = C80A, [A] = 11, and [C457] = 08.

9. Examine the following 68HC11 MPU program and answer the following questions: (2)

```
E230   B6      :LDAA
E231   F6
E232   07
E233   B0      :SUBA
E234   F6
E235   07
E23D   3E      :WAI
```

(a) How many times does the address F607 appear on the address bus? 2

(b) How many times does the MPU perform a memory READ operation except WAI instruction? A WRITE operation?

2 read 1 write

(c) How many times is a new word loaded into the IR? 2

(d) How many times is a new word loaded into the DR? 1

(e) How many times is a new word loaded into ACCA? 1

(f) What are the final contents of ACCA? [A] = $F6

(g) Repeat problem (b) including WAI. 3 read 1 write

10. Assume that the following operands are initially stored in data memory: [C350] = 0A, [C351] = 01, [C352] = FF. (2)

```
C300   B6      ;LDAA   [A] = 0A
C301   C3
C302   50
C303   B0      ;SUBA   [A] = 0A - 01 = 09
C304   C3
C305   51
C306   27      ;BEQ
C307   03
C308   B7      ;STAA
C309   C3
C30A   52
C30B   3E      ;WAI
C30C   ??
```

7. Determine how many bits each of the following registers can hold? (0.7)

PC, DAR, IR, DR, ACCA, Address Latch/Buffer, Data Buffer

8. Assume that initially [PC] = C807, [A] = 09, and [C457] = 08. (0.6)

```
C807   BB     ; ADDA
C808   C4
C809   57
```

At the completion of this instruction, [PC] = _____, [A] = _____, and [C457] = _____.

9. Examine the following 68HC11 MPU program and answer the following questions: (2)

```
E230   B6     :LDAA
E231   F6
E232   07
E233   B0     :SUBA
E234   F6
E235   07
E23D   3E     :WAI
```

(a) How many times does the address F607 appear on the address bus? _____

(b) How many times does the MPU perform a memory READ operation except WAI instruction? A WRITE operation?

_____

(c) How many times is a new word loaded into the IR? _____

(d) How many times is a new word loaded into the DR? _____

(e) How many times is a new word loaded into ACCA? _____

(f) What are the final contents of ACCA? _____

(g) Repeat problem (b) including WAI. _____

10. Assume that the following operands are initially stored in data memory: [C350] = 0A, [C351] = 01, [C352] = FF. (2)

```
C300   B6     ;LDAA
C301   C3
C302   50
C303   B0     ;SUBA
C304   C3
C305   51
C306   27     ;BEQ
C307   03
C308   B7     ;STAA
C309   C3
C30A   52
C30B   3E     ;WAI
C30C   ??
```

(a) What will be [A] and [C352] at the completion of the program? _____

(b) Assume that [C351] = 0A initially and repeat (a). _____

11. A certain program has the op code for a BEQ instruction at address 07A2. What offset should be used to cause branching to 07BC? (0.5)

3.6 /10